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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/923,139	08/06/2001	Leonel R. Arana	010400	8960

26285 7590 06/18/2004

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EXAMINER	-
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CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 06/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/923,139

Applicant(s)

ARANA ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-75 is/are pending in the application.
- 4a) Of the above claim(s) 62-72 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 24-61, 74 and 75 is/are allowed.
- 6) ☒ Claim(s) 1-19, 23 and 73 is/are rejected.
- 7) ☒ Claim(s) 20-22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11-6-01, 8-18-03
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-61 and 73-75, drawn to a micromachined device and a power generator, classified in class 429, subclass 26.
 - II. Claims 62-72, drawn to a method for fabricating a device, classified in class 216, subclass 8.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the process of Group II can be used to make any of the products recited in the independent claims of Group I.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. This application contains claims directed to the following patentably distinct species of the claimed invention:
 - i) a thermoelectric device (claim 20)
 - ii) a thermophotovoltaic device (claim 21)

iii) a refrigeration device (claim 23)

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claim 1 is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

5. During a telephone conversation with Mark Leslie on May 25, 2004 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-61 and 73-75, and specie i (claim 20). Affirmation of this election must be made by applicant in replying to this Office action. Claims 63-73 are withdrawn from further consideration by the examiner, 37

CFR 1.142(b), as being drawn to a non-elected invention. Regarding the election of species, each of the above-noted species has been examined on the merits in this Office action since species i and ii were examined and found to contain allowable subject matter.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-4, 8, 10-12, 15-17, and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Hoffman (U.S. Patent 6,194,066). The reference teaches a micromachined device comprising a tube (see abstract). The tube can be used in micro hydraulic applications (see col. 8, line 34). Regarding claims 1, 3, and 4, the tube has a wall thickness of less than 0.01 microns (see col. 3, line 20). Regarding claim 2, the tube inherently has inlet, intermediate, and outlet

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portions. Regarding claims 15 and 16, a catalyst may be disposed within the tube (see abstract). Regarding claim 17, the tube may be used in a sensor (see col. 5, line 66). Regarding claim 12, the tube may be filled with a material, thereby allowing it to function as a static mixing structure (see col. 5, line 56). Regarding claims 10 and 11, the reference also anticipates the claimed “post” since the interior of the tube may have a roughened surface (see col. 5, line 57). Regarding claim 23, the micromachined device may be a heat exchanger (i.e., a refrigeration device) (see col. 8, line 27).

Thus, the instant claims are anticipated.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 3, 9, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman.

The reference is applied to claims 1-4, 8, 10-12, 15-17, and 23 as stated above. However, the reference does not expressly teach that the tube comprises silicon nitride (claim 3), that the tube is generally U-shaped (claim 9), or that a stop valve is disposed within the tube (claim 13).

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the reference fairly suggests all of the above-noted features to the skilled artisan. Regarding the shape of the tube, in column 3, line 23, the reference teaches that “tubes formed in this way may be fabricated to stand alone in practically any shape imaginable.” Regarding the claimed SiN composition, the reference teaches in column 2, line 62 that the tube may comprise a “nitride.” Additionally, the limitation that the tube contains a stop valve would be rendered obvious based on the disclosure of fuel injectors and micro hydraulics in column 8, lines 25-36. As such, the instant claims are not considered to be distinguished over the Hoffman reference.

11. Claims 1, 2, 6-9, 14, 17-19, and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tadigadapa et al (U.S. Patent 6,477,901).

The reference is directed to a micromachined fluidic apparatus comprising a substrate (101) and a tube (106) (see Fig. 1). Regarding claims 2, 9, and 73, the tube is U-shaped and includes inlet, outlet and intermediate portions (see Fig. 1). Regarding claims 6, 7, and 14, the substrate includes inlet and outlet portions (307) which are connected to the inlet and outlet of the tube (see Fig. 3). Regarding claim 17, the micromachined device can be used as a sensor (see abstract). Regarding claim 18, the device comprises an actuator (see col. 3, line 56). Regarding claim 19, the substrate defines a sealed cavity wherein substantial portions of the tube are disposed within the cavity (see Fig. 4).

The reference does not expressly teach that the wall of the tube has a thickness of less than 50 microns, as recited in claim 1.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the reference's general disclosure of a "micromachined" apparatus would fairly suggest to the artisan that the tube walls are less than 50 microns thick. As is appreciated in the art (note instant specification, page 10), the term "micromachined" generally refers to dimensions on the micron scale. As such, the claimed wall thickness of less than 50 microns is not considered to distinguish over the reference.

Allowable Subject Matter

12. Claims 24-61, 74, and 75 are allowed.

13. Claims 20-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter:

Independent claims 24, 34, 48, 56, 57 each recite, among other features, that a thermally-conductive structure is in thermal communication with a thermally insulating portion of the tube, and independent claim 38 recites that a portion of the tube is disposed within a thermally-conductive region. The closest prior art, Hoffman, teaches in column 8, line 27 that its tube may

be used in “high efficiency heat exchanges and micro heat exchanges.” However, this disclosure does not fairly suggest the structures and configurations recited in the instant claims.

Dependent claims 20-22 recite, among other features, that the micromachined device is part of a thermoelectric device (claim 20), a thermophotovoltaic device (claim 21), and a power generator (claim 22). Hoffman, the closest prior art, does not teach or fairly suggest any of these devices. Accordingly, claims 20-22 also contain allowable subject matter.

As a further note, the term “micromachined device” as used throughout the claims of the instant application has been accorded patentable weight and is considered to have an art-recognized meaning which excludes larger, macro-sized devices (note page 10 of instant specification).

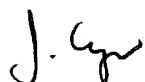
Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (571) 272-1302. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau
Patent Examiner
Art Unit 1746
June 11, 2004